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(54) **AMMUNITION MAGAZINE AND LOADING DEVICE THEREOF**

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(Continued)

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CPC ... ***F41A 9/29*** (2013.01); ***F41A 9/34*** (2013.01); ***F41A 9/80*** (2013.01); ***F41A 9/87*** (2013.01); *F41A 9/79* (2013.01)

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USPC 89/33.1, 33.2, 33.14, 36.08, 36.09, 89/36.13, 36.15, 37.03, 37.15
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

1,719,147 A 7/1929 Tansley 89/33.14
1,901,868 A * 3/1933 Dabrasky 89/33.16
(Continued)

FOREIGN PATENT DOCUMENTS

GB 554714 7/1943

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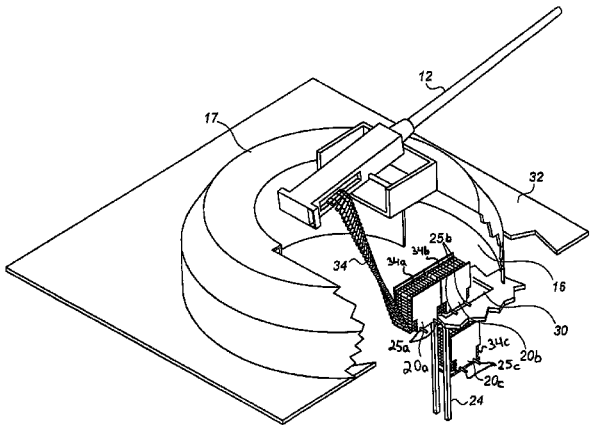
(57) **ABSTRACT**

An ammunition magazine contains an ammunition belt of linked ammunition cartridges to be fed into a machine gun, the magazine including a front opening, enabling a leading end of the ammunition belt to be accessible for feeding the machine gun and for linking with a trailing end of another ammunition belt, and a rear opening, enabling a trailing end of the ammunition belt to be accessible for linking with a leading end of another ammunition belt. An arrangement of consecutive and adjacent ammunition magazines allows movement of an ammunition belt from the distal magazine into the proximal magazine towards the machine gun during operation, enabling continuous feeding of ammunition belts into the machine gun. An ammunition loading system for conveying ammunition between a magazine platform and a hull region, including a lifting mechanism to lift an ammunition magazine into the magazine platform from the hull region.

8 Claims, 7 Drawing Sheets



(51) **Int. Cl.**

F41A 9/29	(2006.01)
F41A 9/87	(2006.01)
F41A 9/79	(2006.01)

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,110,160	A	*	3/1938	Larsson	89/34
2,398,263	A		4/1946	Trimbach	89/34
2,470,475	A		5/1949	Diaper	89/34
2,494,728	A		1/1950	Stacey et al.	89/33.16
2,573,774	A	*	11/1951	Sandberg	89/34
2,889,751	A		6/1959	Bilek	89/34
3,246,565	A		4/1966	Ramseyer	89/33.14
3,333,507	A	*	8/1967	De Meiss	89/36.13
3,566,742	A	*	3/1971	Bemiss	F41H 7/044 277/641
4,092,900	A	*	6/1978	Hottinger et al.	89/33.1
4,393,746	A		7/1983	Rocha	89/34
4,433,609	A	*	2/1984	Darnall	89/34
4,466,333	A	*	8/1984	Kaustrater	89/36.08
4,494,440	A		1/1985	Koine	89/33.04
4,593,600	A	*	6/1986	Kaustrater	89/33.1
4,601,230	A	*	7/1986	LeBlanc	F41A 19/10 89/1.2
4,662,264	A	*	5/1987	Kaustrater	89/33.1
4,667,565	A		5/1987	Anderson	89/36.08
4,951,548	A	*	8/1990	Wixon et al.	89/33.14
4,972,758	A		11/1990	Austin et al.	89/34
4,974,490	A		12/1990	Austin	89/34
5,245,908	A		9/1993	Sanderson	89/34
5,253,574	A		10/1993	Sanderson	89/34
5,263,397	A		11/1993	Sanderson	89/37.22
5,282,410	A		2/1994	Sanderson	89/37.16
5,419,234	A	*	5/1995	Sanderson	B64D 7/00 89/33.16
6,009,791	A		1/2000	Medlin	89/38
6,164,180	A		12/2000	Sulm et al.	89/33.16
6,439,098	B1		8/2002	Dillon	89/34
6,622,606	B1		9/2003	Neal	89/33.01
7,913,610	B2		3/2011	Ulveraker et al.	89/33.14
8,215,225	B1		7/2012	Zangrando et al.	89/46
8,833,228	B2	*	9/2014	Chachamian et al.	89/33.01
2012/0137863	A1		6/2012	Buechler et al.	89/33.14
2013/0000473	A1	*	1/2013	Schvartz et al.	89/33.2

* cited by examiner

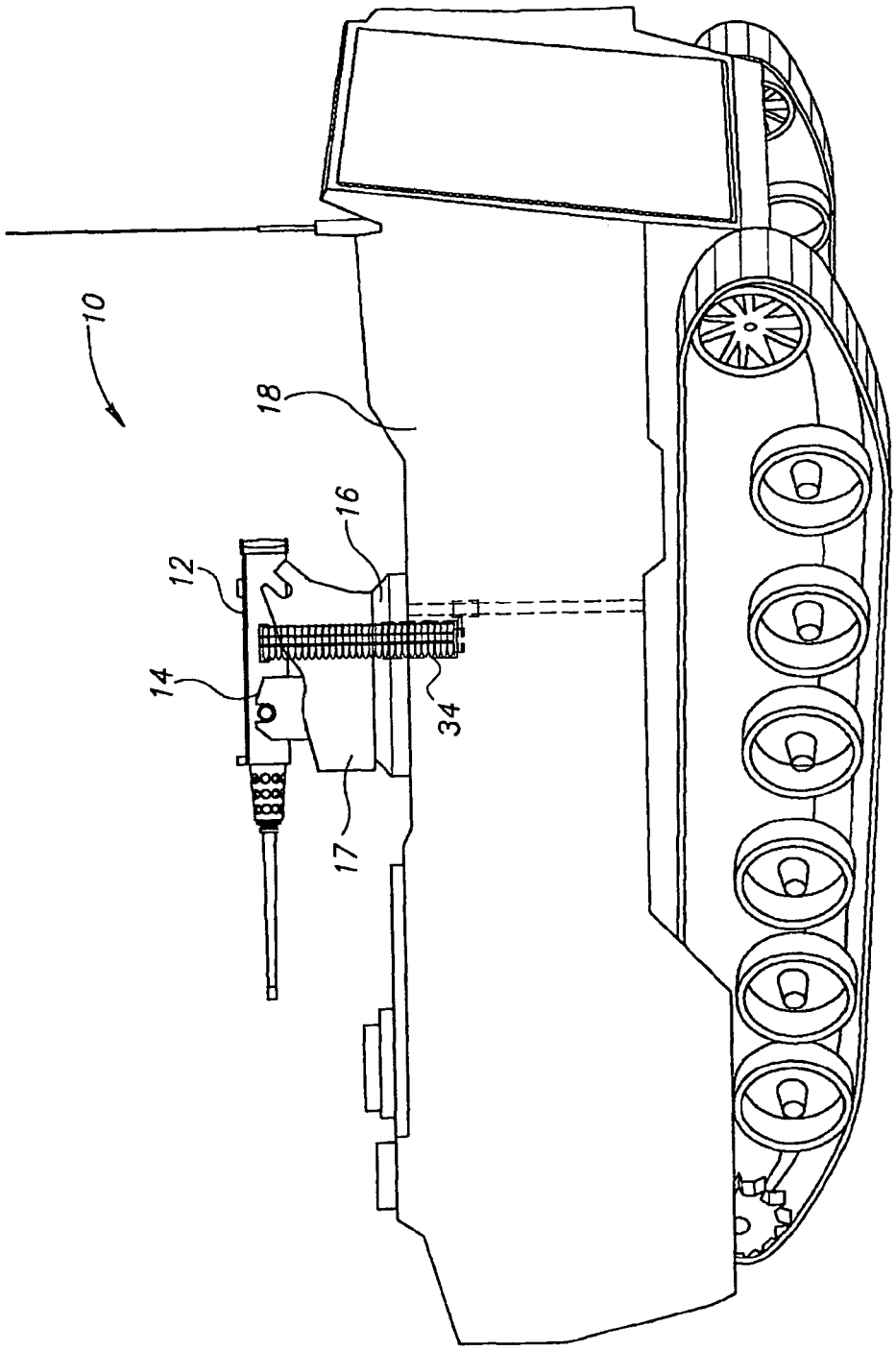


FIG.1

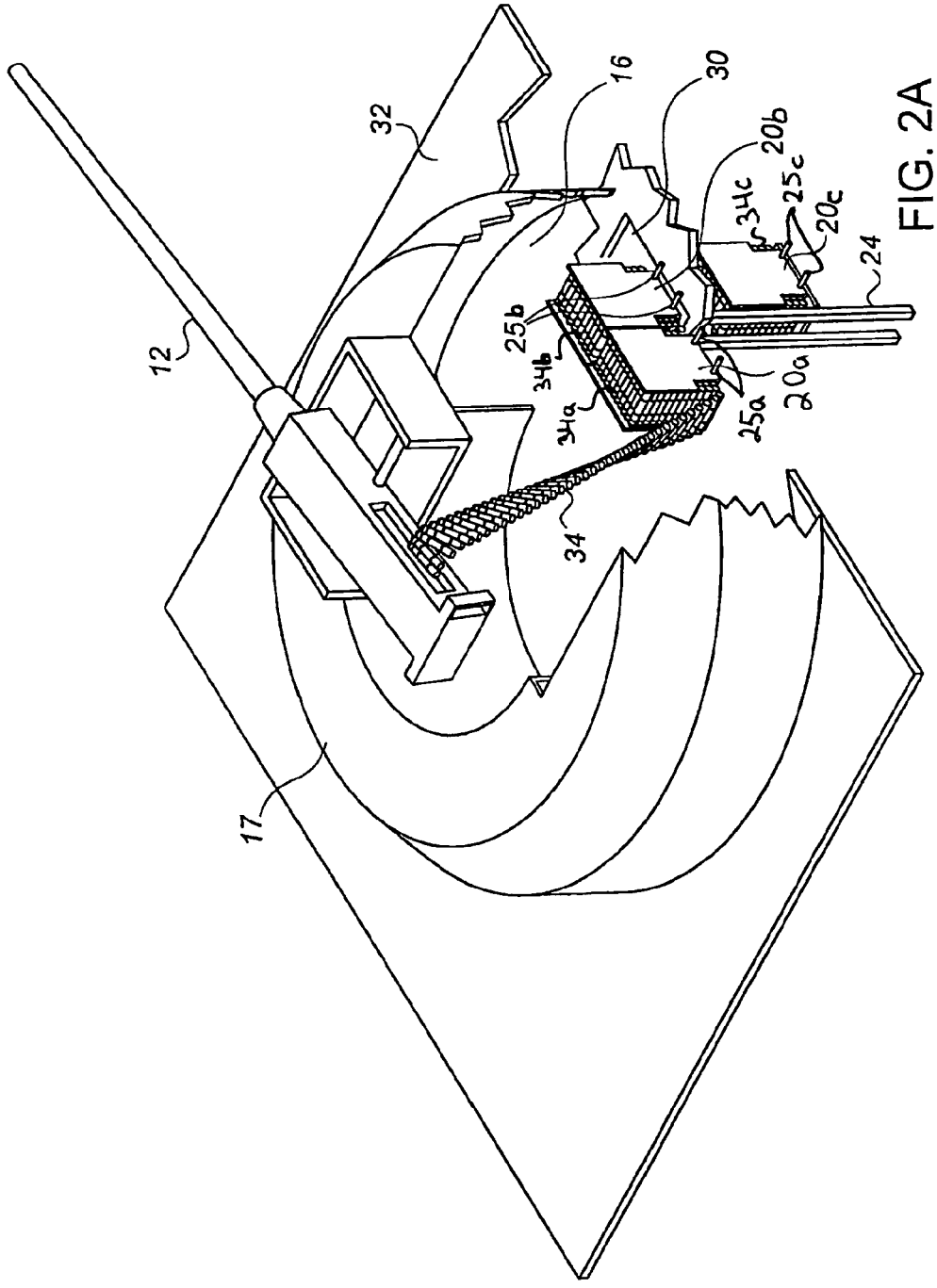


FIG. 2A

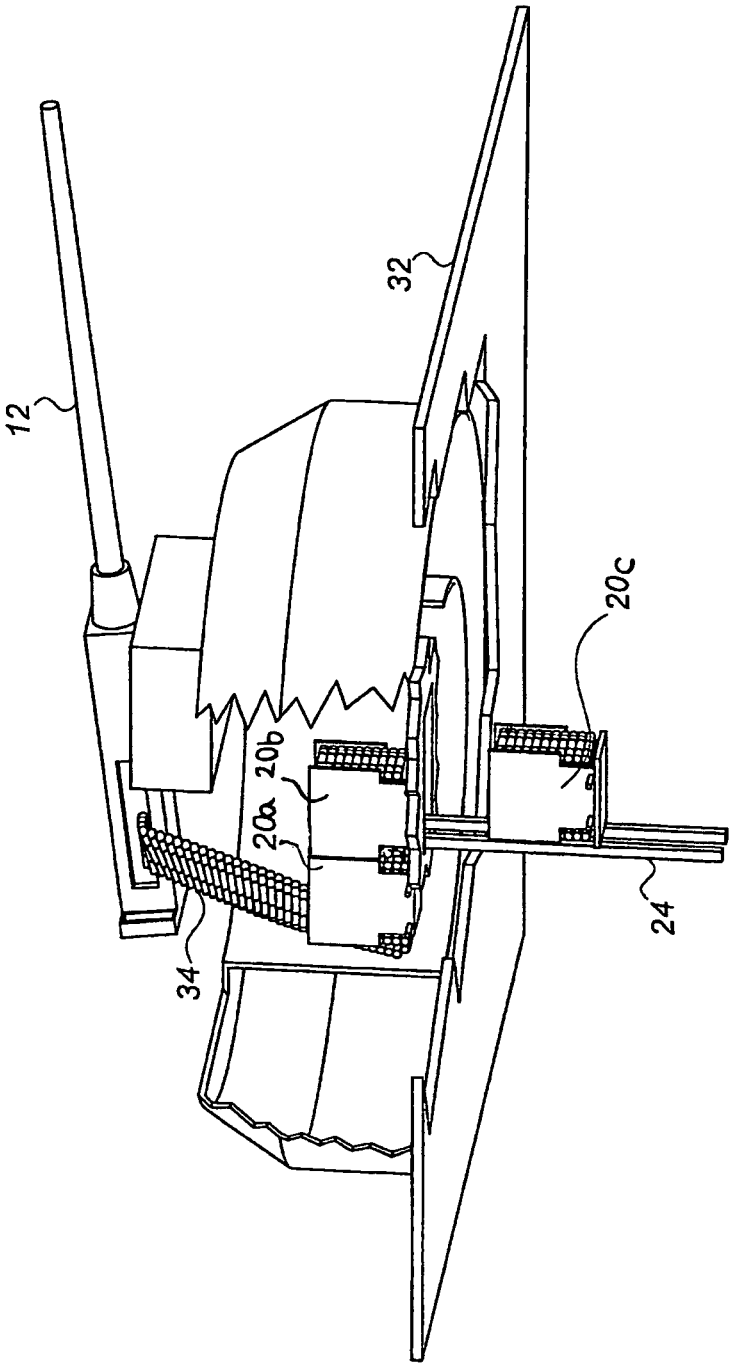


FIG. 2B

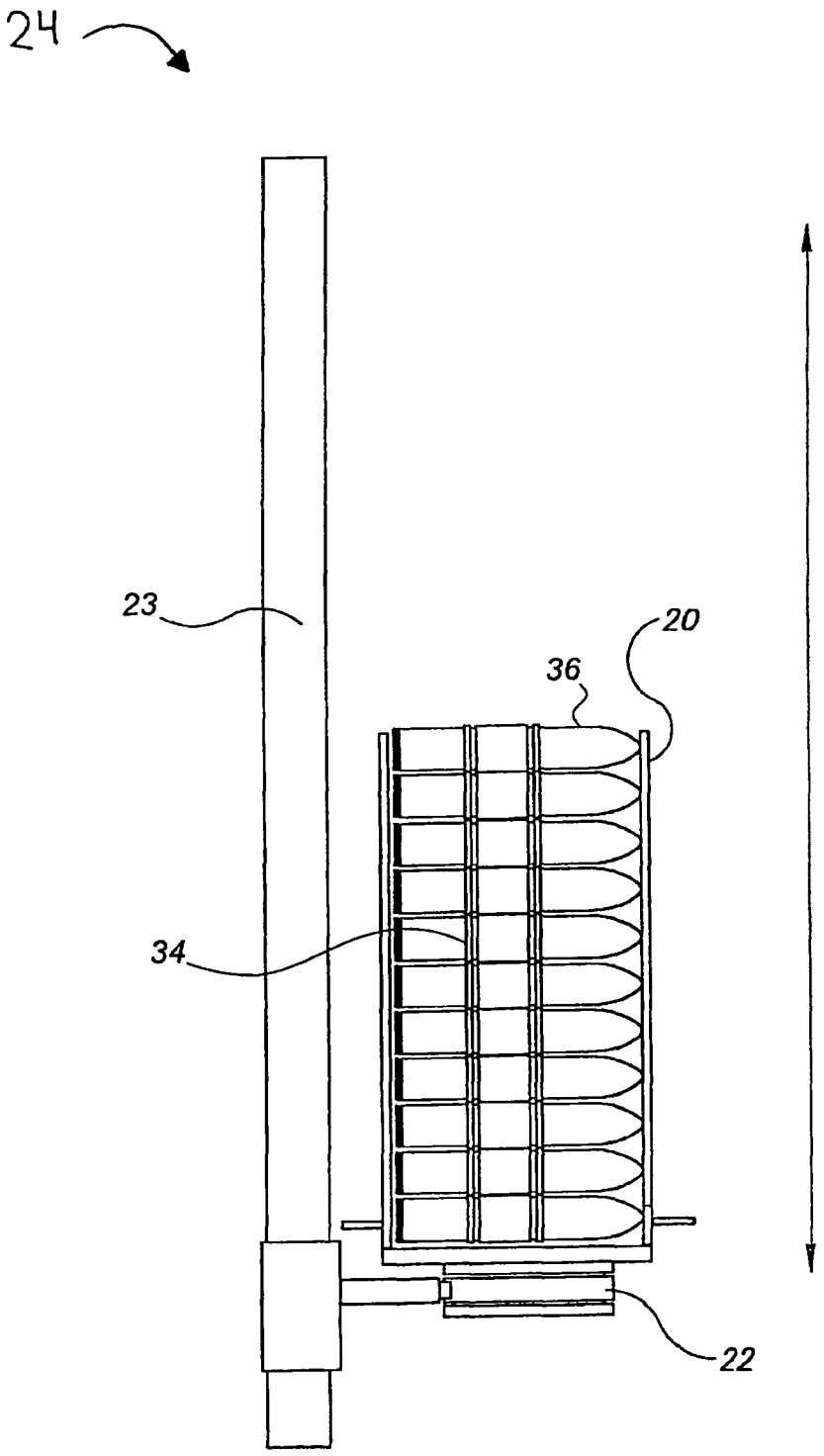


FIG.3

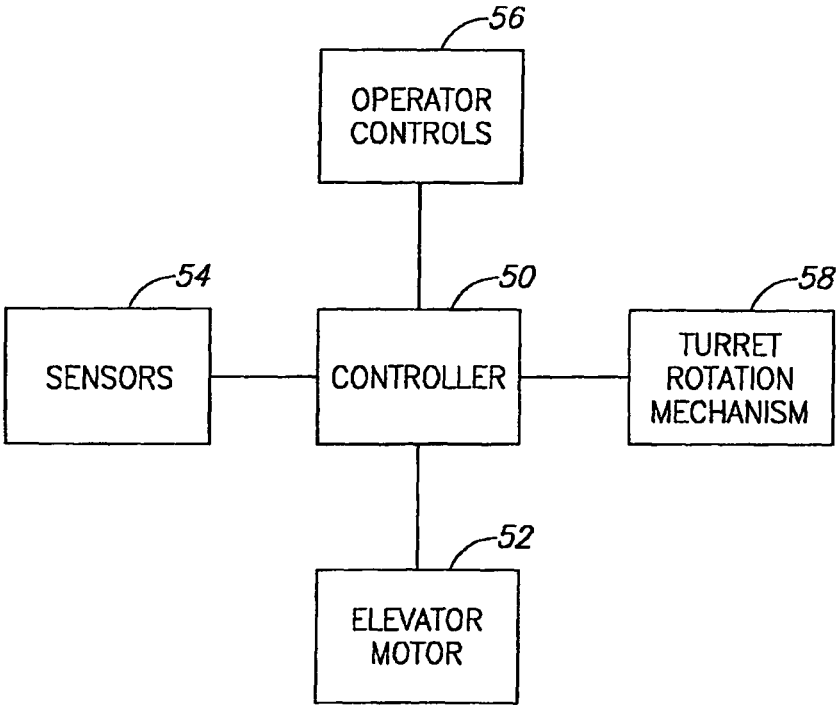

56
OPERATOR CONTROLS
54
50
58
SENSORS
CONTROLLER
TURRET ROTATION MECHANISM
52
ELEVATOR MOTOR

FIG.4

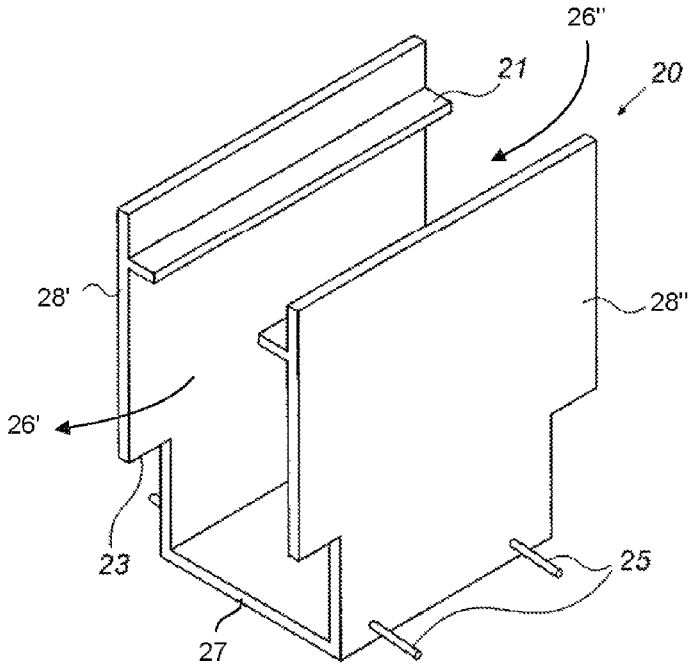


FIG. 5 Amended

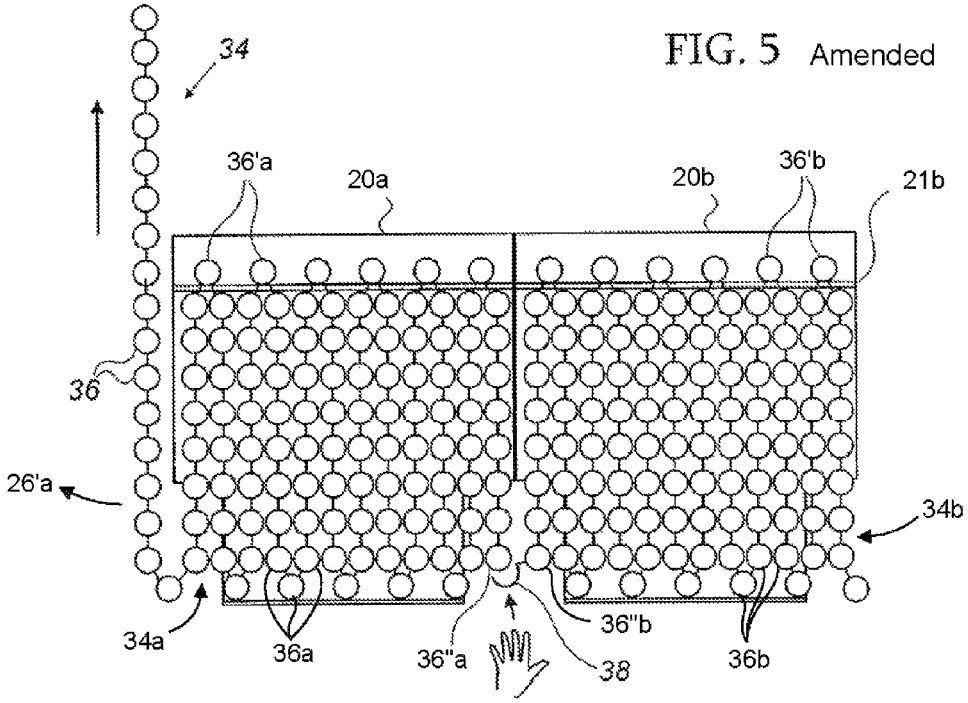


FIG. 6

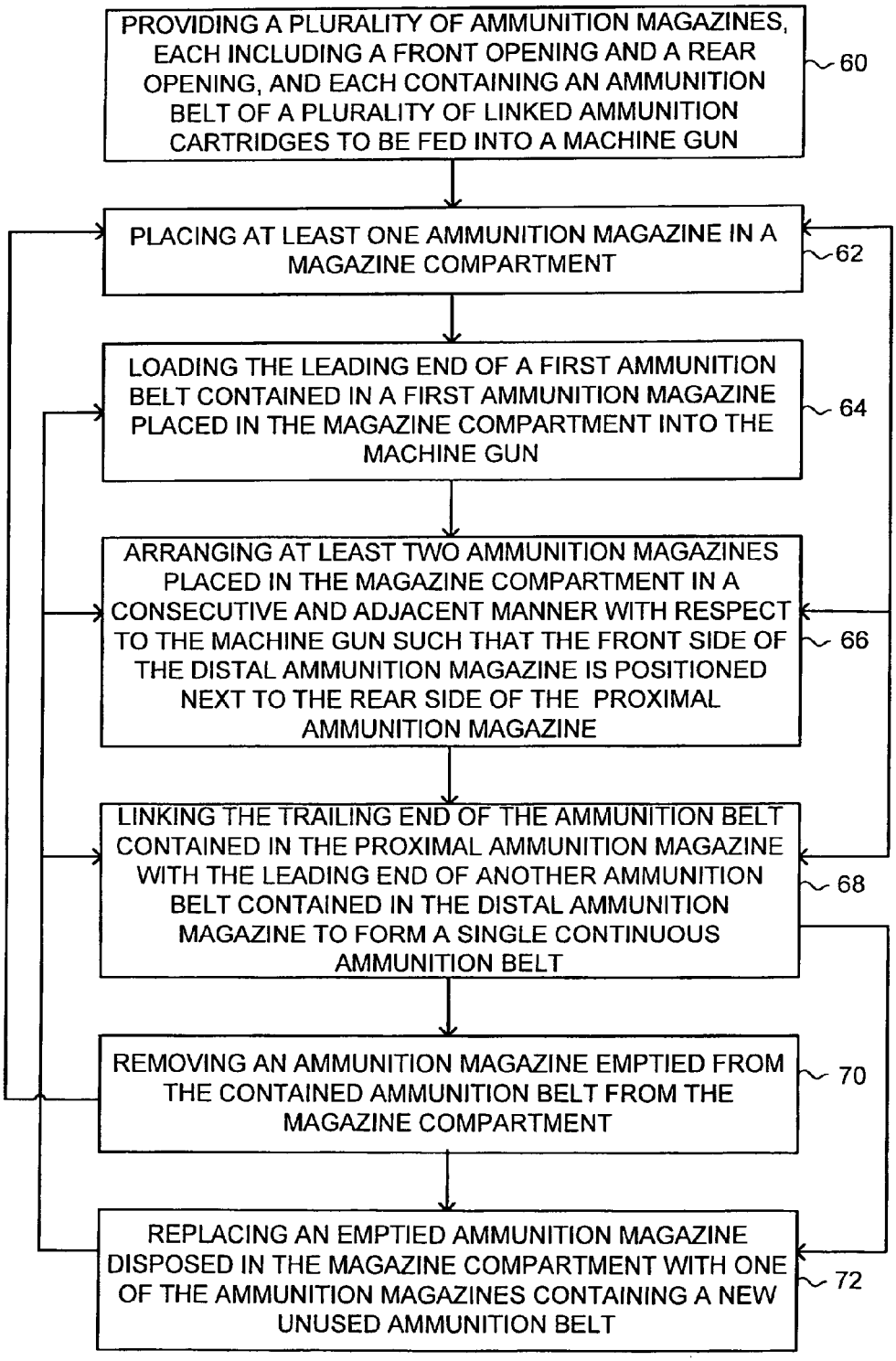

PROVIDING A PLURALITY OF AMMUNITION MAGAZINES, EACH INCLUDING A FRONT OPENING AND A REAR OPENING, AND EACH CONTAINING AN AMMUNITION BELT OF A PLURALITY OF LINKED AMMUNITION CARTRIDGES TO BE FED INTO A MACHINE GUN
60
PLACING AT LEAST ONE AMMUNITION MAGAZINE IN A MAGAZINE COMPARTMENT
62
LOADING THE LEADING END OF A FIRST AMMUNITION BELT CONTAINED IN A FIRST AMMUNITION MAGAZINE PLACED IN THE MAGAZINE COMPARTMENT INTO THE MACHINE GUN
64
ARRANGING AT LEAST TWO AMMUNITION MAGAZINES PLACED IN THE MAGAZINE COMPARTMENT IN A CONSECUTIVE AND ADJACENT MANNER WITH RESPECT TO THE MACHINE GUN SUCH THAT THE FRONT SIDE OF THE DISTAL AMMUNITION MAGAZINE IS POSITIONED NEXT TO THE REAR SIDE OF THE PROXIMAL AMMUNITION MAGAZINE
66
LINKING THE TRAILING END OF THE AMMUNITION BELT CONTAINED IN THE PROXIMAL AMMUNITION MAGAZINE WITH THE LEADING END OF ANOTHER AMMUNITION BELT CONTAINED IN THE DISTAL AMMUNITION MAGAZINE TO FORM A SINGLE CONTINUOUS AMMUNITION BELT
68
REMOVING AN AMMUNITION MAGAZINE EMPTIED FROM THE CONTAINED AMMUNITION BELT FROM THE MAGAZINE COMPARTMENT
70
REPLACING AN EMPTIED AMMUNITION MAGAZINE DISPOSED IN THE MAGAZINE COMPARTMENT WITH ONE OF THE AMMUNITION MAGAZINES CONTAINING A NEW UNUSED AMMUNITION BELT
72

FIG. 7

AMMUNITION MAGAZINE AND LOADING DEVICE THEREOF

REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 13/580,253, which filed Aug. 21, 2012, (presently allowed), which in turn is a US national stage entry of PCT Patent Application PCT/IL2011/000174, filed Feb. 21, 2011. The entire disclosure of the above identified Patent Applications in their entirety is incorporated herein by reference.

FIELD OF THE DISCLOSED TECHNIQUE

The disclosed technique relates to the field of belt-fed ammunition, in general, and to an ammunition magazine and an ammunition loading system and method, in particular.

BACKGROUND OF THE DISCLOSED TECHNIQUE

Remotely controlled weapon systems may be mounted on armored vehicles. A remotely-controlled weapon system is typically mounted on a rotatable turret that is positioned on the roof of a carrier vehicle. The system is typically controlled from within the vehicle or from a remote location. The remote control of the weapon system may include remotely controlling the rotation of the turret, raising or lowering the weapon on the turret, and activating the weapon. An optical system may be provided to facilitate viewing targets. In many cases the optical system is aligned with the weapon, such that it is directed in the same direction as that in which the weapon is aimed.

For quick reloading, small and medium caliber ammunition is usually provided in the form of an ammunition belt of linked cartridges that is fed into the barrel of the gun. Commonly, ammunition belts are stored in a container adjacent to the gun for convenient loading. Additional ammunition may be stored inside the carrier vehicle. Ammunition belts are sometimes provided in magazines.

When a belt of ammunition has been fully used up, it is necessary to feed the gun with a new belt of ammunition, sometimes under battlefield conditions. It is desirable to carry out this operation as quickly as possible in order to maximize the time that the gun is available for use and to minimize the exposure of personnel to enemy fire. Personnel manning the vehicle should preferably not have to leave the interior of the armored vehicle or expose themselves to the exterior of the vehicle.

Under battlefield conditions, the turret may be rotated at frequent intervals in order to aim the gun at various targets on the battlefield. Attempting to load an ammunition belt or a magazine into the turret while the turret is rotating may lead to damage incurred to the turret or to the ammunition, or may lead to injuring personnel manning the turret.

U.S. Pat. No. 3,333,507, entitled "Armored vehicles including a turret fitted with an automatic gun fed from cartridge belt sections packed in boxes", discloses an armored vehicle having a rotatable turret and an automatic gun fed from cartridge belts which are packed in ammunition boxes. The armored vehicle includes an armored body, a rotatable turret, which is mounted on a roller track and is fitted with an automatic gun, and a feed mechanism for feeding the automatic gun with cartridge belt sections packed in ammunition boxes. The armored vehicle further includes an ammunition box guide, means for storing the ammunition boxes in the vehicle, means for maintaining the ammunition boxes in a position, and means to enable the removal of empty ammunition boxes. The ammunition box guide includes inclined rails and is adapted to slidably transfer at least two ammunition boxes, positioned behind one another, one in a waiting position and the other in a firing position, to the automatic gun for firing. The ammunition boxes are stored in a storing position and are engaged against the ammunition box guide by an operator of the vehicle. The operator further engages the cartridge belt section which is in the firing position into the feed mechanism, and secures the front end of the cartridge belt section in the waiting position to the preceding belt section which is already engaged in the feeding mechanism.

U.S. Pat. No. 4,466,333, entitled "Armored vehicle", discloses an armored vehicle having a rotatable turret and a gun carrier mounted thereon. The vehicle further includes an armored body in which an opening is defined and a conveyor. A container reloading station is positioned at a horizontal slideway within the armored body. A container receiving position is positioned on the gun carrier, and is aligned with the container reloading station through the opening. The conveyor conveys magazine containers loaded with belted or unbelted cartridges, for firing, or empty containers for replacement. The magazine containers are conveyed between the reloading station and the receiving position through the opening when the turret and the gun carrier are set on an indexed position.

SUMMARY OF THE DISCLOSED TECHNIQUE

In accordance with an aspect of the disclosed technique, there is thus provided an ammunition magazine containing an ammunition belt of a plurality of linked ammunition cartridges to be fed into a machine gun. The ammunition magazine includes a front opening and a rear opening respective of the machine gun. The front opening enables a leading end of the ammunition belt to be accessible for continuous feeding of the machine gun and for linking with a trailing end of another ammunition belt. The rear opening enables a trailing end of the ammunition belt to be accessible for linking with a leading end of another ammunition belt. The ammunition magazine may include two ledges. Each of the ledges projects internally from a respective side of the ammunition magazine, for supporting selected cartridges of the ammunition cartridges. The ammunition belt is folded vertically inside the ammunition magazine, and the folded portions of the ammunition belt are hanging from and supported by the selected cartridges.

In accordance with another aspect of the disclosed technique, there is further provided an arrangement of at least two of the ammunition magazines disposed in a magazine platform. The ammunition magazines are consecutively and adjacently arranged with respect to the machine gun to allow consecutive feeding of the contained ammunition belts into the machine gun. The front side of a distal ammunition magazine of the at least two ammunition magazines, which is positioned distally with respect to the machine gun, is placed next to the rear side of a proximal ammunition magazine of the at least two ammunition magazines, which is positioned proximally with respect to the machine gun, such that the leading end of the ammunition belt contained in the distal ammunition magazine is linked with the trailing end of the ammunition magazine contained in the proximal ammunition magazine. Each of the ammunition magazines in the arrangement may include two ledges. Each of the ledges project internally from a respective side of each ammunition magazine, for supporting selected cartridges of each respective

ammunition cartridges. Each respective ammunition belt is folded vertically inside each ammunition magazine. The folded portions of each respective belt are hanging from and supported by each respective selected cartridges. The ammunition magazines are further arranged such that the ledges of the proximal magazine and of the distal magazine are aligned to form continuous rails allowing a substantially smooth movement of the ammunition belt, contained in the distal magazine, into the proximal magazine.

In accordance with a further aspect of the disclosed technique, there is thus provided an ammunition loading system for conveying ammunition between a magazine platform and a hull region. The hull region is located beneath the magazine platform, to be used with at least one ammunition magazine. The ammunition loading system includes a lifting mechanism, operable for lifting the at least one ammunition magazine into the magazine platform from the hull region for loading the at least one ammunition belt into the machine gun. The lifting mechanism of the ammunition loading system may include an elevator. The elevator includes a lifting platform operable to be raised and lowered along a vertical track. The at least one ammunition magazine is being placed onto the lifting platform. The elevator may be operable for lowering the at least one ammunition magazine into the hull region from the magazine platform, to allow replacement of the at least one ammunition magazine after it is used.

In accordance with yet a further aspect of the disclosed technique, there is further provided a method for feeding ammunition belts into a machine gun. Each of the ammunition belts includes a plurality of linked ammunition cartridges. The method includes the procedure of providing a plurality of ammunition magazines. Each ammunition magazine is operative for containing a respective one of the ammunition belts. Each of the ammunition magazines includes a front opening and a rear opening respective to the machine gun. The front opening enables a leading end of the contained ammunition belt to be accessible for continuous feeding of the machine gun and for linking with a trailing end of another of the ammunition belts. The rear opening enables a trailing end of the contained ammunition belt to be accessible for linking with a leading end of another of the ammunition belts. The method further includes the procedures of loading the leading end of a first of the ammunition belts contained in a first respective one of the ammunition magazines into the machine gun and of linking the trailing end of the first ammunition belt contained in the first ammunition magazine with the leading end of a second of the ammunition belts contained in a second respective one of the ammunition magazines. The procedure of providing may include providing at least one of the plurality of ammunition magazines with two ledges internally projecting from each respective side of the at least one ammunition magazine, for supporting selected cartridges of the respective ammunition cartridges. The respective contained ammunition belt is folded vertically inside the ammunition magazine. The folded portions of the respective belt are hanging from and supported by the selected cartridges. The method may further include the procedure of placing at least one of the plurality of ammunition magazines containing one of the ammunition belts in a magazine platform. The method may further include the procedure of arranging at least two ammunition magazines of the plurality of ammunition magazines, which are disposed in a magazine platform, in a consecutive and adjacent manner with respect to the machine gun, such that the front side of the distal magazine is positioned next to the rear side of the proximal magazine. The procedure of arranging may include aligning the at least two ammunition magazines. Each of the at least two ammunition magazines further includes two ledges internally projecting from each respective side of each of the ammunition magazines, for supporting selected cartridges of each of the respective ammunition cartridges. Each respective ammunition belt is folded vertically inside each respective ammunition magazine. The folded portions of each respective ammunition belt are hanging from and supported by the respective selected cartridges, such that the ledges of the at least two ammunition magazines are aligned to effectively form two continuous rails allowing a substantially smooth movement of the ammunition belt, contained in the distal magazine, into the proximal magazine. The method may further include the procedure of removing at least one of the plurality of ammunition magazines disposed in a magazine platform after the ammunition magazine is emptied from the contained ammunition belt by the operation of the machine gun. The method may further include the procedure of replacing at least one of the plurality of ammunition magazines, disposed in a magazine platform, after the ammunition magazine is emptied from the contained ammunition belt, with one of the plurality of ammunition magazines, which contains an unused one of the ammunition belts. The method may further include the procedure of linking a leading end of a distal ammunition belt of the plurality of ammunition belts, contained in a respective distal ammunition magazine of the ammunition magazines, which is positioned distally with respect to the machine gun, with a trailing end of a proximal ammunition belt of the ammunition belts, contained in a respective proximal ammunition magazine of the ammunition magazines, which is positioned proximally with respect to the machine gun. The method may further include the procedure of hanging each of the ammunition belts over two ledges internally projecting from each respective side of the plurality of ammunition magazine. The procedure of hanging includes supporting selected cartridges of the ammunition belt over the ledges and folding the ammunition belt vertically inside its respective ammunition magazine, such that the folded portions of the respective belt are hanging from and supported by the selected cartridges.

In accordance with yet another aspect of the disclosed technique, there is further provided a method for feeding ammunition belts into a machine gun. Each of the ammunition belts includes a plurality of linked ammunition cartridges. Each of the ammunition belts is contained in a respective ammunition magazine of a plurality of ammunition magazines. The method includes the procedures of loading into the machine gun a leading end of a first ammunition belt of the ammunition belts through a front opening disposed in a respective first ammunition magazine of the plurality of ammunition magazines and linking the trailing end of the first ammunition belt through a rear opening disposed in the respective first ammunition magazine with the leading end of a second ammunition belt of the ammunition belts through a front opening disposed in a respective second ammunition magazine of the plurality of ammunition magazines. The method may further include the procedure of linking the trailing end of a proximal ammunition belt of the ammunition belts through a rear opening disposed in a respective proximal ammunition magazine, with the leading end of a distal ammunition belt of the ammunition belts through a front opening disposed in a respective distal ammunition magazine of the plurality of ammunition magazines.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosed technique will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings. It should be noted that the

figures are provided as examples only and in no way limit the scope of the disclosed technique. Like components are denoted by like reference numerals.

FIG. **1** is a side view schematic illustration of a combat land vehicle with a remotely controlled gun turret, constructed and operative in accordance with an embodiment of the disclosed technique;

FIG. **2**A is a top perspective schematic illustration of an ammunition loading system, constructed and operative in accordance with an embodiment of the disclosed technique;

FIG. **2**B is a side perspective schematic illustration of the ammunition loading system of FIG. **2**A;

FIG. **3** is a detailed view schematic illustration of the elevator of the ammunition loading system of FIGS. **2**A and **2**B;

FIG. **4** is a block diagram of the control elements of the ammunition loading system of FIGS. **2**A and **2**B;

FIG. **5** is a close up perspective view illustration of an empty ammunition magazine, constructed and operative in accordance with an embodiment of the disclosed technique; and

FIG. **6** is a close up cross-sectional view illustration of an arrangement of two consecutively adjacent ammunition magazines, in accordance with an embodiment of the disclosed technique.

FIG. **7** is a block diagram of a method for feeding of ammunition belts into a machine gun, operative in accordance with an embodiment of the disclosed technique.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The disclosed technique overcomes the disadvantages of the prior art by providing an ammunition loading system and a method for feeding of ammunition belts into a machine gun for a combat vehicle or a stationary post, designed to limit the exposure of personnel to the outside of the vehicle or the stationary post and associated combat risks. The ammunition loading system and the method for feeding ammunition belts into a machine gun enable quick, modular and safe loading and reloading of ammunition magazines to a remotely controlled gun mounted on a turret on the roof of the combat vehicle or of the stationary post. The ammunition loading system is automated or semi-automated, in order to reduce human involvement in the loading process. The disclosed technique further overcomes the disadvantages of the prior art by providing an ammunition magazine which is designed to allow convenient linking of a contained ammunition belt with other ammunition belts and facilitates the continuous feeding and firing and the quick and safe reloading of a machine gun. The design of the ammunition magazine further allows forming various modular arrangements of such ammunition magazines, which facilitate various configurations of the continuous feeding and reloading of the machine gun.

The ammunition magazine is designed to contain ammunition chained in a belt and is formed to allow easy and continuous dispensing of the belt and any ammunition belt linked therewith. The ammunition magazine is designed to facilitate dispensing of the ammunition belt it contains and any ammunition belt linked therewith to an adjacent firearm, and to allow linking of a trailing end of the ammunition belt to a leading end of a matching ammunition belt contained, for example, in an identical or similar ammunition magazine. Thus a continuous ammunition belt may be formed, which may be conveniently delivered to an adjacent firearm, facilitating continuous firing.

The term "ammunition belt" as used herein encompasses an ammunition belt which includes a plurality of segments of ammunition belts linked with one another to form a single continuous ammunition belt. The term "linked" as used herein with regard to ammunition belts encompasses ammunition belts which are linked directly or indirectly, e.g., by using linking fixtures or by using at least another ammunition belt linked therebetween.

The term "machine gun" as used herein encompasses all types of firearms or projectile weaponry operative with belt-fed ammunition, generally via an ammunition belt housed in an ammunition magazine. The terms "machine gun" and "gun" are used interchangeably herein.

The term "combat vehicle" as used herein encompasses all types of vehicles which are armed with a firearm, including land vehicles, aerial vehicles or marine vehicles, generally relating to armoured personnel carriers, such as tanks, or mechanized infantry fighting vehicles, but also including helicopters, battleships, and other vehicles that are typically utilized in a military context. The terms "combat vehicle" and "vehicle" are used interchangeably herein.

The term "hull" or "hull region" as used herein encompasses any region of a combat vehicle, which provides protection for personnel manning the vehicle from combat dangers external to the combat vehicle, including secured premises of the combat vehicle.

The term "automatically", as used herein with regard to the manner of execution of operations or procedures in accordance with embodiments of the disclosed technique, encompasses a semi-automated execution and an execution which is controlled by the operator or which is operator-independent (i.e., without the intervention of the operator).

The term "operator", as used herein, encompasses an operator of a machine gun or an operator of a vehicle in accordance with the disclosed technique or any personnel manning such vehicle.

Reference is now made to FIG. **1**, which is a side view schematic illustration of a combat land vehicle, generally referenced **10**, with a remotely controlled gun turret, constructed and operative in accordance with an embodiment of the disclosed technique. Rotatable turret **17** is mounted atop hull **18** of land vehicle **10**. A magazine compartment **16** of land vehicle **10** is located in rotatable turret **17**. Gun **12** is mounted on remotely-controlled gun mount **14**. Typically, the elevation angle of gun **12** is adjustable through operation of gun mount **14**. The rotation angle of gun **12** is adjustable through the rotation of rotatable turret **17**. The operation of gun mount **14**, the rotation of rotatable turret **17**, and the elevation angle and firing of gun **12** is controllable from inside land vehicle **10**, or from a remote location (i.e., at some distance from land vehicle **10**).

Reference is now made to FIG. **2**A and FIG. **2**B. FIG. **2**A is a top perspective schematic illustration of an ammunition loading system, constructed and operative in accordance with an embodiment of the disclosed technique. FIG. **2**B is a side perspective schematic illustration of the ammunition loading system of FIG. **2**A. The ammunition loading system may be installed in a combat vehicle which include a top mounted machine gun (e.g., gun **12**). Ammunition is fed into gun **12** by an ammunition belt **34**. Ammunition belt **34** includes a chain of individual ammunition cartridges **36** (shown in FIG. **3**). A supply of unused ammunition belts **34** is stored at a location inside the vehicle. Gun **12** pulls on belt **34** as gun **12** is operated. Ammunition belt **34** is contained in one or more ammunition magazines **20** until ammunition belt **34** is removed by an action of gun **12** or by a person loading gun **12**. Ammunition belt **34** may be consisted of a plurality of ammunition belt segments (e.g., belt segment **34***a*, belt segment **34***b* and belt segment **34***c*), each segment contained within a

respective ammunition magazine **20** (e.g., magazine **20***a*, magazine **20***b* and magazine **20***c*, accordingly) and consecutively linked with one another (e.g., belt segment **34***a* is linked with belt segment **34***b*). In order for the ammunition in ammunition magazine **20** to be available for use by gun **12**, ammunition magazine **20** is loaded into a magazine compartment **16**. Magazine compartment **16** is located in rotatable turret **17**. Thus, magazine compartment **16** may rotate in unison with rotatable turret **17**. Magazine compartment **16** is designed to hold or retain ammunition magazines **20** including ammunition belts, which are to be fed into gun **12**.

Magazine compartment **16** may hold one or more ammunition magazines **20** at a given time. Ammunition magazine **20** may include extendible support pins **25**. When ammunition magazine **20** is placed in magazine compartment **16**, support pins **25** may be extended to engage a support structure (not shown) in magazine compartment **16**. The support structure may enable more than one ammunition magazines **20** to be stored in magazine compartment **16**. When more than one ammunition magazine **20** is loaded into magazine compartment **16**, the ends of the ammunition belts in adjacent ammunition magazines **20** may be linked with one another. During operation of gun **12**, ammunition belt segment **34***a* is pulled completely out of one ammunition magazine **20***a*, emptying ammunition magazine **20***a* from ammunition belt segment **34***a*. At that point, gun **12** continues to pull ammunition belt segment **34***b*, linked with belt segment **34***a*, from an adjacent ammunition magazine **20***b*. In this manner, gun **12** continues to operate and utilize all ammunition belt segments **34** from all ammunition magazines **20** that are loaded into magazine compartment **16**.

When an ammunition magazine **20***a* or **20***b* is emptied, or when the amount of ammunition available to gun **12** is to be increased, another ammunition magazine **20***c* may be loaded into magazine compartment **16**. Typically, a full magazine (i.e., containing an ammunition belt segment) is stored within hull **18** of the vehicle (e.g., combat land vehicle **10** of FIG. **1**). Ammunition magazine **20***c* is lifted up to magazine compartment **16** through hatch **30** in roof **32** of the vehicle via an elevator **24**. It is understood that alternative methods of transporting ammunition magazine **20***c* may be employed in conjunction with the disclosed technique. Hatch **30** is located above elevator **24**. Hatch **30** is of such size and shape that magazine **20***c*, when lifted by elevator **24**, can pass vertically through hatch **30**. When magazine **20***c* is lifted to a predetermined height, such as the height occupied by ammunition magazines **20***a* and **20***b*, pins **25***c* of ammunition magazine **20***c* are made to engage magazine compartment **16**. Pins **25** are operated manually, for example, by an operator reaching upward through hatch **30** to operate a mechanical mechanism for extending pins **25**. Alternatively, pins **25** are operated through any other mechanism known in the art, such as, for example, an electromechanical or hydraulic pin extension mechanism. It should be noted that the relative locations of ammunition magazines **20***a* and **20***b* and ammunition magazine **20***c* in FIGS. **2**A and **2**B are illustrative only. Typically, ammunition magazine **20***c* would not be lifted by elevator **24** when another ammunition magazine **20***b* blocks hatch **30**, as is shown. Ammunition magazine **20** may include an alternative type of engagement fixture adapted to engage a supporting structure of retaining means installed in the vehicle, other than, or in addition to, extending pins **25**. For example, the engagement fixture may be embodied by one or more tabs, rods, arms, or similar extensions that extend from ammunition magazine **20** to a corresponding groove, ledge, tab or similar retaining means installed on magazine compartment **16** of combat land vehicle **10** that is configured to support the extension. Alternatively, pins or other extensions may extend from walls or other portions of magazine compartment **16** to a corresponding structure disposed on ammunition magazine **20**. Further alternatively, the bottom of magazine compartment **16** may include a floor, rails, or another structure adapted for retaining and supporting an ammunition magazine. The floor may be provided with one or more openings through which an ammunition magazine may be lifted when the opening aligns with hatch **30**.

Reference is now made to FIG. **3**, which is a detailed view of the elevator of the ammunition loading system of FIGS. **2**A and **2**B. Elevator **24** includes a vertical track **23** and a lifting platform **22**. Lifting platform **22** projects outwards horizontally from vertical track **23**. For example, lifting platform **22** is mounted on a support arm that extends outward perpendicular to vertical track **23**. Lifting platform **22** is of sufficient size and shape to support an ammunition magazine. Elevator **24** is operated by moving lifting platform **22** up and down along vertical track **23**. Lifting platform **22** may be moved along vertical track **23** by means of an electric motor, or alternatively, by a hydraulic, mechanical, electromagnetic, or any other suitable mechanism known in the art for operating an elevator.

Lifting platform **22** can be lowered to a lowered position within a hull region of a vehicle (e.g., hull **18** of combat land vehicle **10**), in order to allow the placing of an ammunition magazine **20** onto lifting platform **22**. A loaded ammunition magazine **20**, containing an ammunition belt **34** (or a segment thereof) with ammunition cartridges **36**, is placed onto the lowered lifting platform **22** by an individual located inside the hull region. Elevator **24** can then be operated by raising lifting platform **22**, thereby moving ammunition magazine **20** upwards from the hull region, e.g., toward hatch **30** in roof **32** of a combat vehicle.

Elevator **24** can cooperate with one or more sensors (not shown) that verify that conditions are suitable for the operation of elevator **24**. For example, it may not be advisable to lift ammunition magazine **20** if hatch **30** in roof **32** (FIG. **2**A) is closed, e.g., by an optional hatch door. A hatch door may be provided with an appropriate optical, mechanical, electromagnetic, acoustic, or other type of door status sensor, as is known in the art. The sensor may provide a signal that indicates whether or not the hatch door is sufficiently opened in order to enable the passage of ammunition magazine **20** through hatch **30**. Alternatively, a control system that controls the hatch door may provide an appropriate signal that indicates the status of the hatch door. Similarly, one or more sensors may be provided to indicate whether magazine compartment **16** (FIG. **2**A) is appropriately oriented to enable loading of magazine **20**. For example, magazine compartment **16** may be loadable through one or more openings, and only when one of the openings aligns with hatch **30**. As another example, magazine compartment **16** may occupy a limited portion of turret **17**, or only a limited portion of magazine compartment **16** can be configured to hold ammunition magazine **20**. An appropriate mechanical, optical, electromagnetic, acoustic, or other appropriate sensor as is known in the art may sense the orientation of magazine compartment **16**. The sensor may provide a signal that indicates whether or not the current orientation of magazine compartment **16** is suitable for loading ammunition magazine **20** through hatch **30**. Alternatively, an encoder associated with a turret orientation control system may provide a signal that indicates the orientation of the turret **17** and the associated magazine compartment **16**.

Similarly, a sensor may be provided to indicate that a space above hatch **30** is not currently occupied by an ammunition

magazine **20**. An appropriate mechanical, optical, electromagnetic, acoustic, or other appropriate sensor as known in the art may be provided. The sensor may provide a signal that indicates whether a space in magazine compartment **16** above hatch **30** is currently occupied by another ammunition magazine **20**. In addition, a sensor may be provided to indicate whether lifting platform **22** is currently holding an ammunition magazine **20** such that ammunition magazine **20** extends upward through hatch **30**. For example, hatch **30** may be provided with an appropriate optical sensor, or an encoder associated with elevator **24**, that may indicate the position of lifting platform **22**.

If elevator **24** were to lift ammunition magazine **20** when conditions were not suitable, damage or injury to equipment or personnel could result. For example, components of elevator **24**, of ammunition magazine **20**, of combat land vehicle **10**, or of turret **17**, could be subject to damage. Similarly, an operator or other personnel occupying combat land vehicle **10** could be injured. Therefore, elevator **24** may be provided with a control system that cooperates with appropriate sensors to disable operation when conditions are not suitable.

Reference is now made to FIG. **4**, which is a block diagram of the control elements of the ammunition loading system of FIGS. **2**A and **2**B. A controller **50** is coupled with an elevator motor **52**, with sensors **54**, with operator controls **56**, and with a turret rotation mechanism **58**. Controller **50** controls the operation of elevator **24**. Controller **50** includes at least one analog or digital electronic circuit, programmable electronic processor, or computer. Controller **50** receives an instruction signal from operator controls **56**. Operator controls **56** include controls to raise or lower lifting platform **22**, and controls to stop the motion of lifting platform **22**. Operator controls **56** are typically located near elevator **24**, and are accessible to the operator at his position within the hull region. The operation of operator controls **56** causes an appropriate signal to be sent to controller **50**.

Controller **50** also receives signals from sensors **54**. Sensors **54** may include sensors that indicate whether conditions are appropriate for operation of elevator **24**. For example, sensors **54** provide signals that indicate the status of a hatch door in hatch **30**, the orientation of magazine compartment **16** relative to the hatch door, the presence of another ammunition magazine in magazine compartment **16**, and/or the presence of another ammunition magazine in elevator **24**. The operation of elevator **24** may be actively restricted based on the indications of sensors **54**. For example, when sensors **54** indicate that conditions are suitable for lifting ammunition magazine **20** up to magazine compartment **16**, the lifting action is enabled, and the operation of operator controls **56** to lift lifting platform **22** results in elevator motor **52** raising lifting platform **22**. On the other hand, should sensors **54** indicate that conditions are not suitable for lifting ammunition magazine **20** up to magazine compartment **16**, the lifting action is disabled, and the operation of operator controls **56** to raise lifting platform **22** does not result in elevator motor **52** raising lifting platform **22**. Optionally, controller **50** generates an audible, visible, or other indication that notifies that raising lifting platform **22** has been disabled. Controller **50** may generate an audible, visible, or other indication that indicates which condition or conditions caused raising lifting platform **22** to be disabled.

Controller **50** transmits signals to control elevator **24**. Controller **50** may control the operation of elevator motor **52** directly or indirectly. For example, controller **50** may cause elevator motor **52** to raise lifting platform **22**, to lower lifting platform **22**, to stop the motion of lifting platform **22**, or to change the speed at which lifting platform **22** is moving. Controller **50** controls the operation of elevator motor **52** by providing appropriate electric currents to elevator motor **52**. Alternatively, controller **50** may generate an appropriate visible, audible, or tactile indication to an operator that indicates to the operator how to operate elevator **50**.

Optionally, controller **50** controls the operation of turret rotation mechanism **58**. Controller **50** directs turret rotation mechanism **58** to rotate turret **17** in either rotation direction, to stop rotation of turret **17**, or to change the speed of rotation of turret **17**. Controller **50** may control the rotation of turret **17** by providing appropriate electric currents to turret rotation mechanism **58**. Alternatively, controller **50** may generate an appropriate visible, audible, or tactile indication to an operator that indicates to the operator how to operate turret **17**. The operation of turret rotation mechanism **58** may be actively restricted based on the indications of sensors **54**. For example, rotation of turret **17** may be limited when sensors **54** indicate that a raised ammunition magazine **20** extends above hatch **30**. Rotation of turret **17** may be limited in such a scenario in order to prevent a collision between the raised ammunition magazine **20** and an opening in turret **17** or another ammunition magazine **20** already in magazine compartment **16**. Controller **50** may generate an audible, visible, or other indication that indicates that rotation of turret **17** has been limited.

Ammunition magazine **20** is designed to enable proper and continuous operation of gun **12**. Reference is now made to FIGS. **5** and **6**. FIG. **5** is a close up perspective view illustration of an empty ammunition magazine, constructed and operative in accordance with an embodiment of the disclosed technique. FIG. **6** is a close up cross-sectional view illustration of an arrangement of two consecutively adjacent ammunition magazines, in accordance with an embodiment of the disclosed technique. Ammunition magazine **20** is designed to contain ammunition belt **34** or a segment thereof. Ammunition magazine **20** includes two substantially parallel vertical side-walls **28'** and **28"** opposite one another, and a joining horizontal base **27** that supports and rigidly connects vertical side-wall **28'** with vertical side-wall **28"** at opposing edges of horizontal base **27**, defining a space in which the ammunition belt is situated. Ammunition magazine **20** includes a front opening, indicated by arrow **26'**, through which the contained segment of ammunition belt **34** (not shown) is pulled towards gun **12** for feeding gun **12** during its operation. The front opening enables the leading end of the contained belt segment to be accessible for continuous feeding of gun **12** or for linking with a trailing end of another segment of ammunition belt **34**. Ammunition magazine **20** further includes a rear opening, indicated by arrow **26"**, in order to enable linking of the trailing end of the ammunition belt segment contained within with the leading end of another segment of ammunition belt **34**.

Ammunition belt **34** includes a chain of connected ammunition cartridges **36**. When held by ammunition magazine **20**, ammunition cartridges **36** are arranged such that the long axis of each ammunition cartridge **36** extends from magazine side-wall **28'** to the opposite side-wall **28"**. Side-wall **28'** and side-wall **28"** are each formed with a perpendicular ledge **21** projecting from an interior surface of the respective side-wall. Ammunition belt **34** is folded vertically into ammunition magazine **20**, such that the top cartridges **36'** are supported by ledges **21** (each ledge **21** supporting a respective end of top cartridges **36'**), while the portions of ammunition belt **34** between top cartridges **36'** are supported by top cartridges **36'** and hang downward below ledges **21** in between magazine side-walls **28'** and **28"**. Ledges **21** are formed in a manner that allows a substantially smooth movement of cartridges **36'**

along ledges **21** while the contained ammunition belt **34** is pulled towards gun **12** during its operation.

An indentation **23** is formed on the bottom corners of each of magazine side-walls **28'** and **28"**. Indentations **23** in magazine side-walls **28'** and **28"** enable access, from each side of or from below magazine **20**, to a leading end and a trailing end of ammunition belt **34** contained in ammunition magazine **20**. Indentations **23** may alternatively be formed on horizontal base **27**, i.e., magazine side-walls **28'** and **28"** are formed without an indentation, allowing access only from below magazine **20**. Such a configuration may be suitable when magazines **20** may be positioned above hatch **30** or when magazines **20** may be positioned in a raised manner with respect to magazine compartment **16**.

Side-walls **28'** and **28"** may alternatively be coupled by other configurations that rigidly couple side-walls **28'** and **28"**, e.g., via a coupling element at the bottom or at the top of magazine **20**. For example, side-walls **28'** and **28"** may be connected by a plurality of supporting boards disposed therein between at the bottom or top of magazine **20**, where the supporting boards extend in a perpendicular or slanted manner with respect to side-walls **28'** and **28"**. Side-walls **28'** and **28"** may be of different shapes other then rectangular as shown in FIGS. **5** and **6**. Ammunition magazine **20** may alternatively include any other type of side supporting structure, for supporting the contained ammunition belt or ledges **21**. For example, ammunition magazine **20** may include a plurality of supporting boards at each side of ammunition magazine **20** instead of side-walls **28'** and **28"**.

With reference to FIG. **6**, an adjacent and consecutive arrangement of ammunition magazines **20***a* and **20***b* is shown. The leading end of an ammunition belt segment **34***b* contained in ammunition magazine **20***b*, is provided with a hooked link **38**. Hooked link **38** is designed to hook over an end cartridge **36"***a* at the trailing end of an ammunition belt segment **34***a* contained in the adjacent ammunition magazine **20***a*. Alternatively, ammunition magazines **20***a* and **20***b* may be arranged such that hooked link **38** is provided at the trailing end of ammunition belt segment **34***a*, and is designed to hook over end cartridge **36"***b* at the leading end of ammunition belt segment **34***b*.

The leading end of ammunition belt segment **34***a* contained in ammunition magazine **20***a* is initially loaded into a chamber of gun **12**. When gun **12** is fired, a cartridge **36** that is loaded into the chamber is fired, and the ammunition belt **34** is pulled and advanced so as to load a next cartridge **36***a* of the ammunition belt segment **34***a* into the chamber.

Ammunition magazine **20***b* containing ammunition belt segment **34***b* may be loaded into magazine compartment **16** at a later time. When ammunition magazine **20***b* is raised to a magazine compartment **16** (FIG. **2**A) already containing a previous ammunition magazine **20***a*, the raised ammunition magazine **20***b* may be placed consecutively and adjacently to the previous ammunition magazine **20***a* with respect to gun **12**, such that the front side of magazine **20***b* is positioned next to the rear side of magazine **20***a*, as shown in FIGS. **2**A, **2**B and **6**. At that point, an operator may reach upward to hook hooked link **38** from the leading end of ammunition belt segment **34***b* contained in raised ammunition magazine **20***b*, which is accessible through the front opening of magazine **20***b* (not indicated), over the trailing end of cartridge **36"***a* of ammunition belt segment **34***a* contained in ammunition magazine **20***a*, which is accessible through the rear opening (not indicated) of magazine **20***a*. As each subsequent ammunition magazine **20** is loaded into magazine compartment **16**, the leading end of its ammunition belt **34** or of a segment thereof is connected to the trailing end of the previous ammunition belt **34** or a segment thereof. In this manner, individual belt segments are attached to form a continuous ammunition belt **34**, enabling the continuous feeding of machine gun **12**.

Ammunition magazines **20***a* and **20***b* may be further arranged in magazine compartment **16** such that ledges **21***a* of magazine **20***a*, positioned proximally with respect to gun **12**, and ledges **21***b* of magazine **20***b*, positioned distally with respect to gun **12**, are aligned to effectively form continuous rails as shown in FIG. **6**. Such an arrangement of magazines **20***a* and **20***b* in magazine compartment **16** allows a substantially smooth movement of top cartridges **36'***b* of belt segment **34***b* from magazine **20***b* into magazine **20***a* when belt segment **34***b* is pulled towards gun **12** during its operation. As ammunition belt segment **34***a* is pulled upward toward gun **12** (FIG. **2**A), each top cartridge **36'***a* is pulled laterally along ledges **21***a*. Eventually, top cartridges **36'***a* are pulled laterally off the ends of ledges **21***a* and out of ammunition magazine **20***a* through the front opening of magazine **20***a* (indicated by arrow **26'***a*). At this point, top cartridges **36'***a* and adjacent ammunition cartridges **36***a* may be pulled upward toward gun **12**. At some point, ammunition belt segment **34***b*, which is linked to ammunition belt segment **34***a*, is also pulled towards gun **12**. Each top cartridge **36'***b* is pulled laterally along ledges **21***b* towards magazine **20***a* and gun **12**. At some point, top cartridges **36'***b* are pulled laterally off the ends of ledges **21***b* and out of ammunition magazine **20***b* onto ledges **21***a* of ammunition magazine **20***a*. Top cartridges **36'***b* and the following ammunition cartridges **36***b* are pulled into magazine **20***a* through the front opening of magazine **20***b* (not indicated) and the rear opening of magazine **20***a* (not indicated). Eventually, top cartridges **36'***b* are pulled laterally off the ends of ledges **21***a* and out of ammunition magazine **20***a* upwards toward gun **12**. If a third ammunition magazine containing another ammunition belt segment is arranged in the same consecutive and adjacent manner with respect to ammunition magazine **20***b*, and is linked therewith, then the continuous feeding and continuous operation of gun **12** may be prolonged.

Thus, a series of magazines **20** may be arranged in the aforementioned manner to allow continuous and modular feeding and continuous and modular operation of gun **12**. The arrangement and alignment of the ledges of ammunition magazines according to the disclosed technique further allows feeding of the machine gun without the need to remove an ammunition magazine, and therefore interrupt the operation of the machine gun, once the ammunition magazine is emptied. In addition, such an arrangement allows emptying the most distal magazines in the arrangement before the contained ammunition belts or segments thereof are fed into the machine gun (i.e., the contained ammunition belt is pulled into the adjacent ammunition magazines), therefore allowing replacement of these ammunition magazines with minimal interruption to the operation of the machine gun, or in some embodiments, without any interruption at all.

Magazines **20** may be arranged in accordance with an embodiment of the disclosed technique, manually by an operator, or automatically, by utilizing a magazine positioning mechanism. Such a magazine positioning mechanism may include a rail structure, rigidly affixed to the floor of magazine compartment **16**, allowing at least one ammunition magazine **20** to slide along the rail structure, once the magazine **20** is placed in magazine compartment **16** and engaged to the rail structure. The magazine positioning mechanism may include or utilize a magazine retaining means, installed in the vehicle, to allow locking, and therefore retaining, engaged ammunition magazine **20** in a plurality of positions. Magazine **20** may include an engagement fixture, such as extending

pins **25**, allowing the engagement of ammunition magazine **20** to a magazine positioning mechanism.

Generally, magazine compartment **16** may contain a specific or maximum number of ammunition magazines **20**. A combat vehicle in accordance with the disclosed technique may generally allow a specific or maximum number of ammunition magazines to be arranged in such a consecutive and adjacent manner to allow the continuous feeding of a roof mounted machine gun. In particular, once ammunition magazine **20** is empty (i.e., emptied from the ammunition belt segment it contained), the empty ammunition magazine **20** may be removed from magazine compartment **16**. Thus, by removing an empty magazine, a replacing ammunition magazine **20**, containing another ammunition belt segment, may be placed and arranged in magazine compartment **16**, in order to supply further ammunition to be fed into gun **12**. Each empty ammunition magazine **20** may be removed immediately, i.e., once emptied, or at some time after it is emptied. Empty ammunition magazines **20** may be removed individually (i.e., one at a time), or multiple empty ammunition magazines may be removed together. For example, combat vehicle **10** may allow an arrangement of three ammunition magazines **20***a*, **20***b* and **20***c* in magazine compartment **16**, as shown in FIGS. **2**A and **2**B, at most. It should be noted that FIGS. **2**A and **2**B depict magazines **20***a* and **20***b* already arranged in magazine compartment **16** while magazine **20***c* is raised onto compartment **16** by elevator **24**. After magazine **20***c* is raised onto magazine compartment **16**, an operator arranges magazines **20***a*, **20***b* and **20***c* in accordance with an embodiment of the disclosed technique. It should be further noted that magazines **20***a* and **20***b* may be arranged respective of one another before magazine **20***c* has been raised. Once magazines **20***a*, **20***b* and **20***c* are suitably positioned, and the contained ammunition belts are linked with one another, respectively, the operator operates machine gun **12**. Magazine **20***a* will be emptied first, following which magazine **20***b* is emptied, followed by magazine **20***c* being emptied. The operator may continuously remove and replace only magazine **20***c*, while magazines **20***a* and **20***b* are retained in compartment **16**, thus shortening the time required to reload gun **12**. In this manner, once emptied, magazines **20***a* and **20***b* are effectively used as a buffering storage for temporally holding segments of ammunition belt **34**, loaded onto magazine compartment **16**, while the segments are pulled towards gun **12** during its operation. [At any time, the operator may remove and replace magazine **20***b* or **20***a* jointly with magazine **20***c*. The removal or replacement of magazines **20** arranged in compartment **16** may be performed jointly, substantially at the same time, or separately.

It should be noted that removing or replacing emptied ammunition magazines and loading filled ammunition magazines with new (unused) ammunition belts, and linking therewith, may be performed during the operation of the machine gun. In an embodiment of a vehicle, including a rotatable turret, such as combat vehicle **10**, at least one ammunition magazine **20** disposed in magazine compartment **16** (e.g., FIGS. **1**, **2**A and **2**B) may be replaced during the operation of machine gun **12**, if the orientation of rotatable turret **16** is such that hatch **30** can be opened for a sufficient duration to allow safely removing, linking and/or replacing of ammunition magazine **20**.

Empty ammunition magazines **20** may be removed manually by an operator in accordance with the disclosed technique through e.g. a hatch (hatch **30** or another hatch designated for removal of magazines **20**), or automatically, by a magazine removal mechanism installed in the vehicle. For example, the removal mechanism may include or utilize a lifting mechanism as installed in combat land vehicle **10**, such as elevator **24** of FIGS. **2**A, **2**B and **3**, operable to lower an ammunition magazine **20** from magazine compartment **16** into hull **18** of combat vehicle **10**. The magazine removal mechanism may further include or utilize a magazine positioning mechanism installed in the vehicle for placing an emptied magazine **20**, disposed in magazine compartment **16**, onto the lifting mechanism (e.g., lifting platform **22**) of elevator **24**, for lowering ammunition magazine **20** into the hull region of the vehicle.

According to an embodiment of the disclosed technique, the retaining means of a vehicle in accordance with the disclosed technique may be further operable to retain the arrangement of ammunition magazines **20** intact in magazine compartment **16**, particularly during the operation of gun **12**. Optionally, at least one empty ammunition magazine **20** may be retained in a fixed manner in magazine compartment **16** of combat land vehicle **10**, to be used as a fixed buffering storage for temporally holding ammunition belt **34** or a segment thereof while it is pulled towards gun **12** during its operation.

According to an embodiment of the disclosed technique, an ammunition magazine may be reused by placing a new ammunition belt **34**, or a new segment thereof, within the empty used ammunition magazine, and then placing the used magazine back in ammunition compartment **16** in order to feed gun **12** with the new, unused, ammunition belt **34**, or a segment thereof, contained within the reused ammunition magazine.

Reference is now made to FIG. **7**, which is a block diagram of a method for feeding of ammunition belts into a machine gun, operative in accordance with an embodiment of the disclosed technique. The method is further described with reference to FIGS. **1** to **6**.

In procedure **60**, a plurality of ammunition magazines is provided to a combat vehicle including a machine gun. Each ammunition magazine contains an ammunition belt, which includes a plurality of linked ammunition cartridges to be fed into the machine gun. Each ammunition magazine includes a front opening enabling a leading end of the contained ammunition belt to be accessible for continuous feeding of the machine gun and for linking with a trailing end of another ammunition belt, and a rear opening enabling a trailing end of the contained ammunition belt to be accessible for linking with a leading end of another ammunition belt. With reference to FIG. **5**, ammunition magazine **20** includes side-walls **28'** and **28"** rigidly connected at the bottom of ammunition magazine **20** at opposing edges of joining horizontal base **27**. Ammunition magazine **20** further includes a front opening, indicated by arrow **26'**, through which the leading end of ammunition belt **34** is accessible, and a rear opening, indicated by arrow **26"**, through which the trailing end of ammunition belt **34** is accessible. The openings may be defined by side-walls **28'** and **28"** and joining horizontal base **27** as shown in FIG. **5**. The providing of a plurality of ammunition magazines **20** may further include providing ledges **21**, formed at each side-wall **28'** and **28"**, respectively, and projecting from an interior surface thereof, for supporting the ends of selected cartridges of the contained ammunition belt (as shown in FIG. **6**). Accordingly, each of the ammunition belts may be hung over two ledges, which project internally from each respective side of the ammunition magazine. Selected cartridges of each ammunition belt may be supported by the ledges, and each ammunition belt may be vertically folded inside each respective ammunition magazine, such that the folded portions of each respective ammunition belt are hanging from and supported by the selected cartridges.

In procedure **62**, at least one ammunition magazine is placed in a magazine compartment of the combat vehicle. The placing of the ammunition magazine may be performed manually by an operator, e.g., by lifting the ammunition magazine through a hatch of the combat vehicle and placing it onto the magazine compartment while the operator is located within a hull region of the vehicle. Alternatively, the placing of the ammunition magazine may be performed automatically by a lifting mechanism of the vehicle. The lifting mechanism may include an elevator, such as elevator **24** as illustrated in FIGS. **2**A, **2**B and **3**, operable to lift ammunition magazines from a hull region located beneath the magazine compartment, as shown in FIG. **1**. In such a case, the placing of the ammunition magazine includes placing the ammunition magazine onto a lifting platform of the elevator and operating the elevator to raise the lifting platform into a magazine compartment of the vehicle, enabling the loading of the ammunition belt contained within the magazine into the machine gun. The ammunition magazine may be positioned onto the lifting platform by a single operator, or alternatively, several operators may lift the ammunition magazine a short distance towards the lifting platform.

When ammunition magazine **20** is lifted to a desired position within magazine compartment **16**, ammunition magazine **20** may be retained within magazine compartment **16** using retaining means, in a further procedure. The retaining means may be embodied by pins **25** affixed to a bottom edge of ammunition magazine **20**, as shown in FIG. **5**. Pins **25** may be extended to engage a supporting structure in magazine compartment **16**, thereby securing ammunition magazine **20** within magazine compartment **16**.

In procedure **64**, a leading end (i.e., the proximal end with respect to the machine gun) of the ammunition belt contained by the ammunition magazine placed in the magazine compartment is loaded into the machine gun. The operator may reach upward or climb upward through a hatch of the vehicle in order to load the leading end of the ammunition belt into the machine gun, while still remaining safely inside a hull region of the vehicle or within secure premises thereof and avoiding exposure to the outside of the hull or secure premises and the associated combat risks.

In procedure **66**, at least two ammunition magazines disposed in the magazine compartment are arranged in a consecutive and adjacent manner with respect to the machine gun such that the front side of the distal magazine (i.e., distally positioned with respect to gun **12**) is positioned next to the rear side of the proximal magazine (i.e., proximally positioned with respect to gun **12**). With reference to FIGS. **2**A and **2**B, magazines **20***a* and **20***b* are arranged consecutively and adjacently with respect to gun **12** such that the front side of magazine **20***b*, which is distally positioned with respect to gun **12**, is positioned next to the rear side (not indicated) of magazine **20***a*, which is proximally positioned with respect to gun **12**. Such an arrangement allows the linking of ammunition belt segments **34***a* and **34***b*, as indicated in FIG. **6**, and will be described in the following procedure. Such an arrangement further allows for smooth continuous feeding of machine gun **12**.

The at least two ammunition magazines may be further arranged such that ledges projecting internally from a respective side of each ammunition magazine, for supporting selected cartridges of the contained ammunition cartridges, are aligned. With reference to FIG. **6**, magazines **20***a* and **20***b* may be further arranged in magazine compartment **16** such that ledges **21'***a* and **21'***b* and ledges **21"***a* and **21"***b* are aligned to effectively form a continuous rail which allows a substantial smooth movement of ammunition belt segment **36***b* from magazine **20***b* into magazine **20***a* along ledges **21'***b* and **21"***b* and **21'***a* and **21"***a*, accordingly, when ammunition belt segment **36***b* is pulled towards gun **12** during its operation.

The arrangement of at least two ammunition magazines **20** in magazine compartment **16** may be performed manually by an operator or automatically by a magazine positioning mechanism of the vehicle. Such mechanisms are known in the art and may be, for example, a track rigidly fixed to magazine compartment **16** along which magazines **20** slide and therefore can be positioned in a plurality of positions according to the desired arrangement. With reference to FIG. **5**, magazine **20** includes pins **25** which may slide along such a track in magazine compartment **16**. The arrangement of ammunition magazines **20** according to the disclosed technique may include more than two ammunition magazines **20**, as presented in FIGS. **2**A and **2**B (i.e., an arrangement of three ammunition magazines **20**), and may be determined according to relevant criteria, such as the type of ammunition used or the limitations presented by the structure and the features of a vehicle.

When at least two ammunition magazines **20** are positioned in a desired arrangement within magazine compartment **16** in accordance with the disclosed technique, the arrangement of ammunition magazines **20** may be retained within magazine compartment **16** using retaining means, in a further procedure, in order to keep the arrangement intact in magazine compartment **16**, especially during the operation of gun **12**. The retaining means may be incorporated in the magazine positioning mechanism and may be embodied by pins **25** affixed to a bottom edge of ammunition magazine **20** (FIG. **5**). Pins **25** may be extended to engage the magazine positioning mechanism, e.g., a rail structure, in a manner that allows movement of magazine **20** along the rail structure in magazine compartment **16**. The magazine positioning mechanism may be further adapted to allow locking of magazines **20**, by locking pins **25** of magazine **20**, each in at least one position along the rail structure, thereby securing an arrangement of ammunition magazines **20** within magazine compartment **16**.

In procedure **68**, the trailing end of an ammunition belt, or a segment thereof, contained in a distal ammunition magazine is linked with the leading end of another ammunition belt, or a segment thereof, contained in a proximal ammunition magazine with respect to the machine gun in order to form a single continuous ammunition belt. With reference to FIG. **6**, the trailing end of a first ammunition belt **34***a* contained in a first ammunition magazine **20***a* is linked with the leading end of a second ammunition belt **34***b* contained in a second ammunition magazine **20***b*. For example, hooked link **38** of the first cartridge **36"***b* at the leading end of the second ammunition belt **34***b* is hooked onto the last cartridge **36"***a* at the trailing end of first ammunition belt **34***a*. Ammunition magazine **20** may be further provided with indentations **23**, which may be formed on the bottom corners of side-walls **28'** and **28"** of ammunition magazine **20**, as shown in FIG. **5**. Indentations **23** allow an operator a bottom access (i.e., from below ammunition magazine **20**) and a lateral access (i.e., through the sides of ammunition magazine **20**) to the leading end and the trailing end of ammunition belt **34** contained within ammunition magazine **20**. Thus, with reference to FIG. **6**, the operator may link the leading end of ammunition belt **34***b* with the trailing end of ammunition belt **34***a* while ammunition magazines **20***a* and **20***b* are disposed in magazine compartment **16**. In order to do so, the operator may reach upward through hatch **30** (illustrated in FIG. **2**A) while still remaining safely inside hull **18** and avoid exposure to the outside of a combat vehicle and the associated combat risks.

In procedure **70**, an ammunition magazine emptied from the ammunition belt it contained is removed from the magazine compartment. Once an ammunition magazine disposed in the magazine compartment is used by the machine gun (i.e., the ammunition magazine is emptied from the ammunition belt it contained), the used and empty magazine may be removed from the magazine compartment. With reference to FIGS. **2**A and **2**B, as gun **12** is operated, ammunition belt **34***a* is pulled out from ammunition magazine **20***a*. Once ammunition magazine **20***a* is empty, it may be removed from magazine compartment **16**. The removal of a magazine **20** from magazine compartment **16** may be performed manually by the operator reaching for magazine **20** and lowering magazine **20** into hull **18**, located beneath magazine compartment **16**, through hatch **30**, while the operator is safely located within hull **18**. The removal may alternatively be performed automatically by a magazine removal mechanism of combat land vehicle **10**. The removal may include removing by a dedicated lifting mechanism or by the lifting mechanism used for placing ammunition magazines **20** in magazine compartment **16**. The lifting mechanism may include an elevator, e.g. elevator **24** as shown in FIGS. **2**A, **2**B and **3**. The elevator is operated to lower a lifting platform from the magazine compartment to a lower position in the combat vehicle, enabling the removal of a used ammunition magazine. In particular, an operator located within hull **18**, which is located beneath magazine compartment **16**, operates elevator **24** to lower lifting platform **22** of elevator **24** from magazine compartment **16** to a floor of hull **18**. The operator then removes the used ammunition magazine **20** from lifting platform **22**. The operator remains safely inside hull **18** and is not exposed to the outside of the combat vehicle and the associated combat risks involved. Magazine **20** may be retained in magazine compartment **16** by retaining means of the combat vehicle, e.g., magazine **20** is engaged to a supporting structure by pins **25**. In such a case, prior to lowering lifting platform **22**, the operator must disengage magazine **20** in a further procedure. The operator may reach upward through hatch **30** and retract pins **25** of empty ammunition magazine **20**, while still remaining safely inside hull **18**. The retraction of pins **25** disengages pins **25** from supporting structure in magazine compartment **16**, thereby enabling ammunition magazine **20** to be lowered through hatch **30** and into hull **18**. The magazine removal mechanism may further include a moving mechanism disposed in magazine compartment **16** in order to move an emptied magazine **20** to a removal position, e.g., above hatch **30**. Alternatively, the removal mechanism may utilize or may be integrated in the magazine positioning mechanism of the combat vehicle (or vice versa).

In procedure **72**, emptied (i.e., used) ammunition magazine disposed in the magazine compartment of the combat vehicle is replaced with one of a plurality of ammunition magazines containing a new unused ammunition belt, to be fed into the machine gun. Generally, the procedure includes the previous procedures of removing a used emptied ammunition magazine and placing an ammunition magazine containing an ammunition belt (i.e., unused) in the magazine compartment. The replacement of an empty ammunition magazine may be performed manually or automatically or by a combination thereof. The manual replacement may be performed by manually removing the emptied magazine and manually placing an ammunition magazine containing an unused ammunition belt instead of the removed magazine as described in previous procedures. The replacement may be performed automatically by utilizing a lifting mechanism of the combat vehicle. The lifting mechanism may include an elevator such as elevator **24**, as shown in FIGS. **2**A, **2**B and **3**. The elevator is operated to lower a lifting platform from the magazine compartment to a lower position in the combat vehicle, enabling the replacement of an empty ammunition magazine with an ammunition magazine containing another, unused, ammunition belt. In particular, an operator located within hull **18**, located beneath magazine compartment **16**, operates elevator **24** to lower lifting platform **22** from magazine compartment **16** to a floor of hull **18**. The operator then removes the empty ammunition magazine **20** from lifting platform **22**, and places another ammunition magazine **20** (i.e., containing an unused ammunition belt **34**) onto lifting platform **22**. The operator may then operate elevator **24** to raise lifting platform **22** back toward magazine compartment **16**, as in a previous procedure described hereinabove. The operator remains safely inside hull **18** and is not exposed to the outside of the vehicle and the associated combat risks involved.

The procedure may further include the previous procedure of linking the unused ammunition belt with an ammunition belt contained within an ammunition magazine previously placed in the magazine compartment to allow the continuous feeding of the machine gun. The procedure may additionally include the previous procedure of arranging the replacement magazine in the magazine compartment to form an arrangement of magazines according to the disclosed technique.

The replacement of an ammunition magazine **20** disposed in magazine compartment **16** may be generally performed during the operation of gun **12**. In particular, a consecutive and adjacent arrangement of three magazines **20***a*, **20***b* and **20***c* is disposed in magazine compartment **16** (as shown in FIGS. **2**A and **2**B). Magazine **20***c* may be replaced once it is emptied from the ammunition belt segment **34***c* (not indicated) contained within, and while ammunition belt segment **34***c* is contained within ammunition magazines **20***b* or **20***a* (e.g., by sliding over ledges **21***b* or **21***a* towards gun **12**). A replacement magazine **20***c*' (not indicated) for emptied magazine **20***c* is placed and arranged in magazine compartment **16** in a consecutive and adjacent manner with respect to magazine **20***b*, replacing empty magazine **20***c*. A leading end of ammunition belt **34***c*', contained within replacement magazine **20***c*', is linked by the operator with the trailing end of ammunition belt **20***c*, while ammunition belt **20***c* is contained within magazine **20***b* or magazine **20***a*. The trailing end of ammunition belt **20***c* may be in motion as it is pulled towards gun **12** during the operation of gun **12**. In such a case, the operation of gun **12** may be slowed down, (e.g., by utilizing computer software, which controls the firing rate of the machine gun), or even stopped, if required, in order to allow the linking of ammunition belt **34***c*' with ammunition belt **34***c*.

The method may include an additional procedure, in which the operator provides instruction signals for operating the lifting mechanism, e.g., elevator **24** as shown in FIGS. **2**A, **2**B and **3**. In particular, with reference to FIGS. **3** and **4**, an operator located within hull **18**, located beneath magazine compartment **16**, operates operator controls **56** to raise lifting platform **22** of elevator **24** toward magazine compartment **16** located in turret **17** above roof **32** of hull **18**. Prior to raising lifting platform **22**, the operator may verify that current conditions are suitable for raising lifting platform **22**. For example, the operator may verify that hatch **30** in roof **32** of hull **18** is open and not blocked. Additionally, the operator may verify that magazine compartment **16** is properly situated with respect to hatch **30**, and that there is sufficient space in magazine compartment **16** to accommodate ammunition magazine **20**. The operator may further operate operator controls **56** to lower lifting platform **22** of elevator **24** to approach the floor of hull **18**, in order to place ammunition magazine **20**

onto the lowered lifting platform **22** or in order to replace an empty ammunition magazine **20** positioned on lifting platform **22** with another ammunition magazine **20** containing an unused ammunition belt **34**. The operator may then operate operator controls **56** to raise lifting platform **22** of elevator **24** back toward magazine compartment **16**, as in the previous procedure described hereinabove. The operator remains safely inside hull **18** and is not exposed to the outside of the combat vehicle and the associated combat risks involved.

The method may include another procedure, in which the operation of a lifting mechanism according to the disclosed technique, for example, elevator **24** as shown in FIGS. **2**A, **2**B and **3**, is controlled in accordance with a defined condition. In particular, with reference to FIGS. **3** and **4**, sensors **54** may be provided to sense whether conditions are suitable for raising lifting platform **22**. Controller **50** may be configured to generate a visible, audible, or other type of signal to notify the operator whether conditions sensed by sensors **54** are suitable for operation of elevator **24**. Controller **50** may also be configured to enable, disable, or limit the operation of elevator **24** in accordance with conditions sensed by sensors **54**. When conditions are determined to be suitable, the operator may operate elevator **24** to raise lifting platform **22** until ammunition magazine **20** is raised above hatch **30** and into magazine compartment **16**.

The method may further include a procedure in which a leading end of at least one distal ammunition belt, contained in a respective distal ammunition magazine, is linked with a trailing end of a proximal ammunition belt contained in a respective proximal ammunition magazine. The distal ammunition magazine is positioned distally with respect to the machine gun, and the proximal ammunition magazine is positioned proximally with respect to the machine gun. The proximal and distal ammunition magazines are positioned in the proximity of the machine gun and may be placed or arranged in a magazine compartment in accordance with the disclosed technique (as shown in FIGS. **2**A and **2**B). According to this procedure, each newly placed ammunition magazine (i.e., which may be as an addition to ammunition magazines already disposed in the proximity of the machine gun, or as a replacement for an emptied ammunition magazine that has been removed) may be linked with a proximal ammunition magazine to form a single continuous ammunition belt, to allow for continuous feeding of the machine gun.

It is appreciated that procedures **60**, **64** and **68** may be incorporated into two procedures. In a first procedure, a leading end of a first ammunition belt of a plurality of ammunition belts, each having a plurality of ammunition cartridges and contained in a respective ammunition magazine, is loaded into the machine gun through a front opening disposed in the respective first ammunition magazine. In a second procedure, the trailing end of at least the first ammunition belt is linked through a rear opening disposed in the respective first ammunition magazine with the leading end of another of the plurality of ammunition belts through a front opening disposed in the respective ammunition magazine. All of the aforementioned magazine auxiliary mechanisms and means that may be included or incorporated in a combat vehicle in accordance with the disclosed technique, including the lifting mechanism, the retaining means, the magazine positioning mechanism and the magazine removal mechanism, may be embodied by different types of mechanisms, means and various configurations as known in the art, e.g., by adapting the guide or maintaining means of U.S. Pat. No. 3,333,507 mentioned hereinabove or by adapting the conveyor of U.S. Pat. No. 4,466,333 also mentioned hereinabove.

An ammunition magazine in accordance with the disclosed technique may be a disposable or a reusable magazine. In addition, the ammunition magazine may be already provided with an ammunition belt disposed within, or alternatively, the ammunition belts may be provided separately, to be loaded into the ammunition magazines on site (e.g., during the preparations of a combat vehicle for an operation or during the operation thereof). Ammunition magazines in accordance with the disclosed technique may include ammunition belts, or segments thereof, of different types of ammunition (e.g., ammunition of different calibers) linked therewith.

The ammunition magazine, the ammunition loading system, and the method for feeding ammunition belts into a machine gun of the disclosed technique are described hereinabove as used in conjunction with a combat vehicle. According to alternative embodiments, the ammunition magazine, the ammunition loading system and the method for feeding ammunition belts into a machine gun of the disclosed technique may each be used in conjunction with a stationary post (e.g., buildings, posts established in trenches or bunkers, and the like). Accordingly, all relevant components or elements or operations or procedures of the disclosed technique described hereinbelow are equally applicable to an ammunition magazine, ammunition loading system or a method for feeding ammunition belts into a machine gun used on a stationary post, with any suitable modifications where necessary.

An ammunition magazine, an ammunition loading system or a method for feeding ammunition belts into a machine gun according to an embodiment of the disclosed technique may be operative to load or feed a machine gun mounted on a fixed turret (i.e., not necessarily a rotatable turret) or any other suitable mounting structure, or a machine gun which is simply disposed on the ground. The ammunition magazine, the ammunition loading system and the method for feeding ammunition belts into a machine gun may be furthermore operative to load or feed a machine gun disposed in other configurations, i.e., rather than top-mounted, with respect to the vehicle or stationary post.

An ammunition magazine, an ammunition loading system, and a method for feeding ammunition belts into a machine gun, according to embodiments of the disclosed technique may be used with a combat vehicle or a stationary post which includes any type of a platform operative to hold or retain magazines (i.e., a magazine platform) in proximity of a machine gun, rather than a magazine compartment. Such a magazine platform may include the ground (e.g., in the case of a machine gun placed in the proximity of a trench), raised, lowered or leveled surfaces or structures with respect to the machine gun and open (i.e., exposed to the exterior of the vehicle or stationary post or unsecured premises thereof) or closed (e.g., magazine compartment **16** of FIGS. **2**A and **2**B) structures.

Thus the disclosed technique enables the quick and continuous feeding of a machine gun of a combat vehicle or stationary post, with minimal intervention of an operator and minimal disruption to the operation of the machine gun. Furthermore, the disclosed technique enables a modular feeding, loading and reloading, thus facilitating different configurations of feeding the machine gun and loading and reloading of the ammunition magazines to suit the specific desires, or needs and requirements as dictated by, e.g., a specific machine gun, ammunition, combat vehicle or stationary post, fighting or manning personnel or combat operation. In addition, the disclosed technique enables an operator to load or reload a heavy ammunition magazine into a magazine platform in a top-mounted turret of a combat vehicle or stationary

post. A single operator may perform most tasks related to the loading or reloading unassisted and in a minimal period of time, freeing the operator and other occupants of the combat vehicle or stationary post to perform other tasks. An operator need not leave the interior of the hull (secured premises) of the combat vehicle or stationary post during reloading of the magazine platform, avoiding exposure to dangers (e.g., combat risks) outside the combat vehicle or secured premises thereof.

It will be appreciated by persons skilled in the art that the disclosed technique is not limited to what has been particularly shown and described hereinabove.

The invention claimed is:

1. An ammunition loading system, for enabling the replacement of an ammunition magazine of a machine gun of a combat vehicle by an operator located within a protected hull region of said combat vehicle, the system comprising:

a rotatable turret at a non-protected region of said combat vehicle;

an exposed machine gun, mounted on an external gun mount coupled to said turret;

a magazine compartment coupled to said turret, said magazine compartment configured to retain a plurality of ammunition magazines comprising ammunition belts for feeding said machine gun, where the loaded ammunition belt extends from said magazine compartment and into said machine gun;

a hatch of said combat vehicle, situated between said hull region of said combat vehicle and said magazine compartment, said hatch configured to be opened when said turret is rotated to a selected orientation; and

such that an empty ammunition magazine, emptied from the contained ammunition belt, is removable from said magazine compartment through the open hatch while said operator is located within said hull region,

such that a new ammunition magazine containing an unused ammunition belt is liftable up through said open hatch and placeable onto said magazine compartment while said operator is located within said hull region, and

such that the leading end of said unused ammunition belt of said new ammunition magazine is linkable, when located at said hull region, by said operator located within said hull region, with the trailing end of an ammunition belt contained within an ammunition magazine previously placed in said magazine compartment, to allow continuous feeding of said machine gun without exposing the operator to a non-protected region of said combat vehicle.

2. The ammunition loading system of claim **1**, wherein said new ammunition magazine is configured to be placed onto said magazine compartment manually by said operator reaching upward through said open hatch.

3. The ammunition loading system of claim **2**, wherein said empty ammunition magazine is configured to be removed from said magazine compartment manually by said operator reaching upward through said open hatch, before said new ammunition magazine is placed onto said magazine compartment.

4. The ammunition loading system of claim **1**, further comprising a lifting platform operable to be raised toward said magazine compartment and lowered to said hull region, wherein said new ammunition magazine is configured to be placed onto said magazine compartment automatically via said lifting platform, after said operator places said new ammunition magazine onto said lifting platform.

5. The ammunition loading system of claim **4**, wherein said empty ammunition magazine is configured to be removed from said magazine compartment automatically via said lifting platform, before said new ammunition magazine is placed onto said magazine compartment.

6. A method for the replacement of an ammunition magazine of a machine gun of a combat vehicle, by an operator located within a protected hull region of said combat vehicle, the method comprising the procedures of:

rotating a rotatable turret at a non-protected region of said combat vehicle to a selected orientation;

opening a hatch of said combat vehicle, said hatch situated between said hull region of said combat vehicle and a magazine compartment coupled to said turret, said magazine compartment configured to retain a plurality of ammunition magazines comprising ammunition belts for feeding said exposed machine gun mounted on an external gun mount coupled to said turret;

removing an empty ammunition magazine, emptied from the contained ammunition belt, from said magazine compartment, through the open hatch, while said operator is located within said hull region;

lifting a new ammunition magazine containing an unused ammunition belt through said open hatch and placing said new ammunition magazine onto said magazine compartment, while said operator is located within said hull region; and

linking the leading end of said unused ammunition belt of said new ammunition magazine when located at said hull region, by said operator located within said hull region, with the trailing end of an ammunition belt contained within an ammunition magazine previously placed in said magazine compartment, to allow continuous feeding of said machine gun without exposing the operator to a non-protected region of said combat vehicle.

7. The method of claim **6**, wherein at least one of the procedures of:

removing an empty ammunition magazine from said magazine compartment through the open hatch;

lifting a new ammunition magazine containing an unused ammunition belt through said open hatch and placing said new ammunition magazine onto said magazine compartment; and

linking the leading end of said unused ammunition belt of said new ammunition magazine with the trailing end of an ammunition belt contained within an ammunition magazine previously placed in said magazine compartment,

is performed manually by said operator reaching upward through said open hatch.

8. The method of claim **6**, wherein at least one of the procedures of:

removing an empty ammunition magazine from said magazine compartment through the open hatch; and

lifting a new ammunition magazine containing an unused ammunition belt through said open hatch and placing said new ammunition magazine onto said magazine compartment,

is performed automatically via a lifting platform operable to be raised toward said magazine compartment and lowered to said hull region.

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